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Fig. 1.
p. 183.

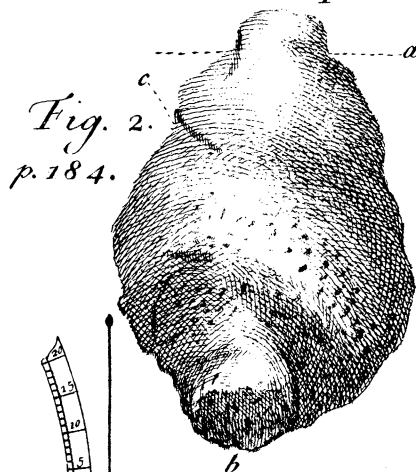


Fig. 2.
p. 184.

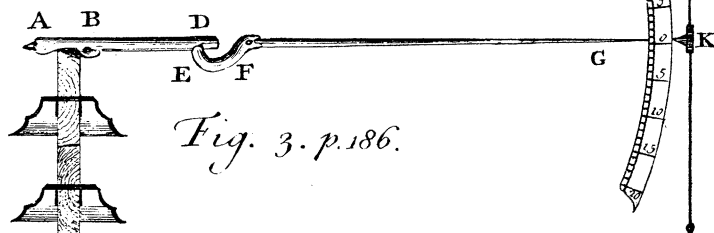


Fig. 3. p. 186.

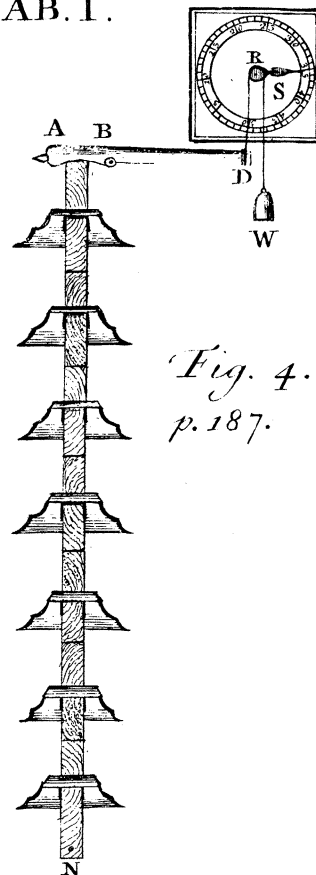


Fig. 4.
p. 187.

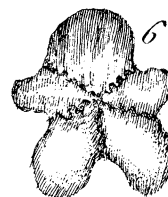
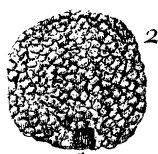
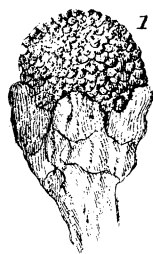


Fig. 5.
p. 190.

Fig. 2. the posterior and under Side, which rested partly upon the *Prostatae*. This Side of the Stone was attach'd to the Bladder.

a. the Place where the Body of the Bladder was contracted in Form of the Neck of a Gourd.

b. the Extremity, which was lodged in the Beginning of the *Urethra*.

c. the Impression made by the Nail of the Forefinger of my left Hand, in passing it between the Stone and the Inside of the Bladder, in order to detach them from each other, and to dilate the Bladder sufficiently to introduce the Crochet.

II. *The Description of an Hygrometer made of a Deal Rod : Being Part of Two Letters from Mr. William Arderon, F.R.S. to Mr. Henry Baker, Fellow of the said Society.*

S I R,

* * *

Read May 8. 1746. **I**N *October* last I contrived and made an Hygrometer; the first Hint whereof I received from Observations on the Swelling of Deal Doors against Rain.

I perceived this Wood expanded itself very considerably, laterally, or across its Grain: And this I imagined, if properly made use of, might shew, not badly, the different Degrees of Moisture or Dryness in the Air.

These Thoughts set me upon searching the *Philosophical Transactions* (as I do most commonly, when I take

I take notice of any thing remarkable in the Works of Nature or Art), to see if any ingenious Person had recorded his Opinion upon this Subject : And I found (N°. 127.), that an anonymous Author had made several Attempts to construct Hygrometers of Deal Boards *; and again (N°. 129.), that Mr. *J. Coniers* had added some Improvements thereto; but, as the Method taken by these two Gentlemen seemed liable to some Objections, I determined to make a Trial on a Plan and Form intirely different from theirs; and have been so fortunate to find it succeed greatly beyond my Expectations.

My Way was thus :

I procured a Piece of coarse Deal Board; most of it, if not all, Sap. From this I sawed seven Pieces cross the Bate or Grain, 10 Inches long and an Inch broad; and as the Board was just an Inch in Thickness, I thereby consequently obtain'd 7 Parallelopipeds of an Inch square each.

These 7 Pieces of Deal I joined together, lengthways, with strong Glew; which made a square Rod of 70 Inches long.—I found it necessary to place these small Pieces in such a manner, when I glewed them together, in respect to their Grain, as is represented in the two Figures annex'd, to prevent their forming themselves into a Sort of Curve; which they naturally do, if they are placed all the same Way; and I found myself obliged to fix the Rod in such a Number of Brackets as appear in the Drawings, in order to keep it strait. I placed

* This Author says, Poplar would do much better; but of that I have had no Trial.

I placed this Rod, at first, perpendicular to the Horizon, betwixt two Pieces of Wood of the same Thickness, and nailed against the Cieling of my Room; but then I had one Side only exposed to the Air: However it acted tolerably well, which encouraged me to try to make it more perfect; as you'll find delineated TAB. I. *Fig. 3.* and *Fig. 4.*

Both these Deal Rods were placed against the Cieling of my Room with Brackets, and were buttoned down into square Mortises in each Bracket with small Pieces of Deal, that fitted their Tops exactly. Hereby all their four Sides became exposed to the Air; and the only Difference between them is, the increasing the Effect of their Variation by two different Methods.

To the Rod at *Fig. 3.* I added two Levers: The first of which *ABD* had its shorter End *AB* but 3 Inches in Length, and its longer *BD* 12; consequently the End *D* moved through 4 times the Space that the End *A* did.

The second Lever *EFG* I fixed to act with the other before mention'd. The shorter End *EF* of this Lever was 3 Inches, and the longer End *FG*, 45 Inches; whereby the Effect of the other Lever was increased 15 times, and that of the Deal Rod 60 times. So that if the Rod lengthens but one Tenth of an Inch, the Point of the Lever *G* moves 6 Inches; and if the Rod lengthens but one Inch, the Point *G* moves 60.

The longer End of the second Lever in *Fig. 3.* must be made so much heavier, that it may move down freely by its own Gravity whenever the Bar shortens.

To

To this Hygrometer I fixed a small Index, such as is common in Mr. *Hauksbee's* Barometers, to slip up and down on a Wire, as is represented at *K*.

Fig. 4. represents another Method I employed to increase the Power of the Deal Rod. This may be fixed in a much smaller Compass, and yet is no less capable of shewing the minute Differences in the Moisture or Dryness of the Air than the other before described.

The Deal Rod in this was managed and fastened in the same manner as was shewn before. I likewise applied a Lever *ABD* to the Top thereof, exactly of the same Dimensions as in the other; but, instead of a second Lever, I placed a graduated Circle, with an Index thereto like that of the Minute-Hand of a Clock.

This I fixed to a small *Axis*, which was moved one Way by a silken Thread wrapped twice or thrice round it, whereof one End was tied to the longer End of the Lever at *D*, and the other Way by the Gravity of the Weight *W*.

And here, if the Length of the Index *RS* be 15 times as long as the Semi-diameter of the *Axis* which the Silk turns upon, it is evident that our Sensibility of the Rod's Alteration will be increased 60 times, &c.

The Deal Rod is strongly nailed down at *N*, both in the first and second Draught; but, in all other Parts, they have free Liberty of Contraction or Dilatation.

Unless I am too much prejudiced in Favour of this Hygrometer, it far exceeds all that I ever saw; and I may take upon me thus far to assert, that, by acting
ten

ten or twelve Hours before the apparent Change of Weather happens, as this has done since I got it finish'd ; it may very much assist to form a true Judgment on the impending Changes, when the Wind is in or near the East or West Point, when the Barometer is of little or no Service.

I observe, that Heat and Cold have a considerable Power of lengthening and shortening the Deal Rod, as well as the Moisture and Dryness of the Air ; and this, at first Sight, would induce one to imagine, that it would thereby be render'd almost useless ; but it is really far otherwise ; for, by placing it near a Thermometer, it is easily rectify'd with respect to its Expansion or Contraction, by Heat or Cold, at the same time that it truly shews the various Degrees of Moisture or Dryness in the Air. In short, it is an Instrument made very easily, of Materials to be got almost everywhere, and of little Cost. It is capable of being serviceable either by Sea or Land, and may be placed in any Direction.

I have lately finished one of these Hygrometers, the Bar whereof is but a Foot in Length, yet, by making the two Levers of Metal, I easily make the End of the second Lever rise and fall 8 Inches. At this Size it becomes portable, and answers the End or Purpose as well as the other. I am,

Dear Sir,

Your most obedient Servant,

Wm. Arderon.

Since

Since my writing this, I have been turning over a little Treatise of the ever memorable Mr. *Boyle* upon the Hygroscope, wherein I find he had made several Trials with different Sorts of Wood ; but then they were turned into the Shape of Bells ; which, he says, answered very well, by comparing their Weights : That their different Weight increased or diminished, according to the different Degrees of the Air's Moisture ; and that he had taken notice of the Expansion of the Wood in Doors and Door-Cases : But he proceeds no farther than to recommend the different Kinds of Wood to be examined by their Weight.

London, May 8. 1746.

III. *A Letter from R. Badcock, Esq; to Mr. Henry Baker, F. R. S. concerning the Farina foecundans of the Yew-Tree.*

S I R,

*Read May 15.
1746.*

AS I take upon myself a sort of Share in the Study and Discoveries of the Philosophic World, I esteem it a Debt incumbent on me to advance that Part of it I have engaged myself in, by communicating whatever I find worthy of it. The following Discovery is, I believe, worthy your Notice ; as, in the Course of my Experiments, I never yet met with any thing equal to it.

On the 3d of *March*, strolling round my Garden in Search of Objects, I observed a Yew-Tree in Blof-
som,